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ABSTRACT

Twelve educable or trainable Ss, 14 to 22 years of age, who were institutionalized residents of a state school for the retarded, were examined in a simple vigilance test to determine effects of knowledge-of-results (KR) contingent upon correct responses. Each S in the KR group was instructed to press a switch upon seeing a light signal and to watch two lights. Also, each KR was told the pilot lamp would light if the response was quick enough. The appropriate behavior was demonstrated and the Ss were given time for practice. Findings significantly supported the hypothesis that performance of Ss who received KR would be superior to Ss who were without KR. (Author/MC)

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THE INFLUENCE OF KNOWLEDGE-OF-RESULTS WITH MENTAL RETARDATES ON A SIMPLE VIGILANCE TASK[1]

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ABSTRACT

The effects of knowledge-of-results (KR), contingent upon correct responses, was examined in a simple vigilance task with twelve institutionalized residents of a state school for the retarded. It was hypothesized that the performance of Ss who received KR would be superior to those Ss who were in the group without knowledge-of -results (WKR). Analysis of the data revealed a significant difference between the KR and WKR groups ($t = 9.27$, $p < .01$, $df = 10$) in the direction hypothesized and the graphic representations of the data revealed the typical decrement associated with vigilance studies.

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Few studies have been published which are concerned with the vigilance performance of mentally retarded (MR) individuals as compared to the enormous amount of research with normals which has occurred since World War II (Halcomb and Blackwell, 1969). However, in an attempt to discover new methods of rehabilitating the MR, vigilance research is a means of investigating the feasibility of vocational placement in industry, on repitious tasks, for this population.

Most vigilance studies, using normal Ss, have demonstrated an increase in performance when environmental variations are introduced into the vigilance task (e.g., McCormack, 1959; Hardesty, Trumbo and Bevan, 1963; Loeb and Binford, 1964). However, similar investigations with the MR have not produced a statistically significant improvement in performance (Semmel, 1964; 1965). Ware, Baker and Sheldon(1964) found a statistically reliable increase in performance on a simple vigilance task with retardates who had knowledge-of-results (KR) for missed signals as compared to a group without knowledge-of-results (WKR). Chinn and Alluisi (1964) reported that KR concerning correct responses produced a reliable decrease in the number of missed signals for normal Ss. Therefore, it was hypothesized that retardates who received KR for correct responses, would perform superior to retardates WKR.

METHOD

Subjects

Six male and six female mentally retarded residents of a state school for the retarded served as Ss. Their mean chronological age was 18-2 and ranged from 14-6 to 22-6. Their mean I.Q. derived from the WISC, WAIS, and Stanford-Binet intelligence tests was 47 and ranged from 33 to 73. Retarded Ss were selected without regard to etiological classification except that those with gross sensory or motor disturbances were excluded. All Ss had also had prior experience in one previous vigilance task (Perryman, Griffin and Landers, 1970).

Apparatus

The Ss visual display consisted of a modified Leigh Valley Electronics, Inc. three section split screen module (Model No. 521-43) mounted on a grey .3048 meters by .3048 meters plywood box. The display was modified to the extent that the three screens were partitioned from each other to permit the installation of three 28 volt lamps. These lamps then provided the programmed display. Each of the sections of the module were commercially fitted with response keys. The stimuli consisted of the two outer panels displaying light signals which were on a second and off a second. This display was programmed using a BRS Foringer electronic timer in conjunction with a simple timing circuit and an alternating stepper. The middle panel displayed a two second signal, randomly, either 30 seconds, 60 seconds, or 90 seconds apart for a total of 36 signals in 36 minutes. These signals were automatically programmed by a Gerbrands variable-interval programmer.

Attached to the top of the display box was a 10.16 cm by 15.24 cm by .3048 meters metal box. Directly above the three panel display, attached to the metal box, was a 3.8 cm pilot lamp. The pilot lamp, when activated, signaled KR to the S. However, it was mandatory that the S respond within two seconds of the onset of the signal to receive KR (the pilot lamp being activated for one second). Hence, a connection was established between the three response keys, pilot lamp, and variable-interval programmer in conjunction with a simple timing circuit to produce a signal after the appropriate response.

The entire stimulus display was mounted at approximately eye level in a 1.37 meters by 1.37 meters by 2.13 meters isolation booth. A constant source of white noise at approximately 65 db was delivered to mask extraneous sound and provide a uniform auditory environment during the experiment. Observation of the S was possible via a two-way mirror. Lighting was made contingent upon a General Electric, Cool White, 15 watt fluorescent lamp. The signal presentations and the Ss responses were recorded by a six pen Gerbrands Event Recorder.

Procedure

Twelve Ss were randomly assigned to either Group I (KR) or Group II (WKR). Each S was brought from his or her cottage and due to scheduling had a five to ten minute wait before being admitted to the isolation booth. Prior to Ss entry into the isolation booth the white noise and the stimulus display were activated. For the KR group the S was instructed to "press the light in the middle", as soon as he saw a signal, and to also watch the two outside lights.

S was further instructed that if he responded quickly enough, when signal was presented, the pilot lamp would light. To insure that S understood the instructions, E demostrated the appropriate behavior to exhibit for the first signal, then a brief practice period of three signals (at 15 second intervals) was given before the session began. The E left the isolation booth and did not return until the vigilance session was completed.

Each S received nine signals per nine minute block with four blocks for a total of 36 minutes and 36 signals. For WKR group the S's requirements were the same as before, with the exception that the S did not receive and was not informed of the KR.

RESULTS AND CONCLUSIONS

Analysis of the data revealed a significant difference between the KR and WKR groups ($t = 9.27$, $p < .01$, $df = 10$). In other words, a statistically reliable improvement in performance occurred with the retarded Ss who received KR as compared to the WKR group. Also the graphic representations (see Figure 1)

Insert Figure 1 About Here

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of the data revealed the typical decrement associated with vigilance studies.

The limited amount of information which is currently available for the MR population in a vigilance task appears to direct us toward two conclusions: environmental variations introduced into the vigilance task does not increase performance and KR appears to increase performance. The first position is supported by

Semmel (1965) who discovered that introducing interpolated rest and/or novelty conditions had no reliable effect on the S's ability to improve vigilance when compared to a control group. Likewise, Landers, Perryman and Griffin (1971) found no reliable effect between groups who had novelty during a vigilance session as compared to a group without novelty.

However, KR has increased performance of the MR in a vigilance task.KR seems to exhibit certain qualities of reinforcement and punishment for the retarded. Azrin and Holtz (1966) defined reinforcement as a consequence of behavior that increases the future probability of that behavior and punishment as a consequence of behavior that decreases the future probability of that behavior. Perryman (1972) utilzed operant conditioning techniques to increase the performance of the MR in a vigilance task. KR was provided to the Ss via a light display in which the lights were contingent upon the S's correct response to the vigilance signal. The number of lights (or correct responses) which the S accumulated were redeemable for tangible reinforcers at the termination of the session. Ware et al. (1962) demostrated the effectiveness of KR as a punisher. Likewise, the present experiment verifies the effect of KR as a reinforcer.

Therefore, additional research with the MR is necessary to determine if KR (reinforcement and punishment) are the only effective means of increasing vigilance performance with this population. Environmental variations may be effective means of increasing performance once vigilant behavior has been shaped.

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FOOTNOTE

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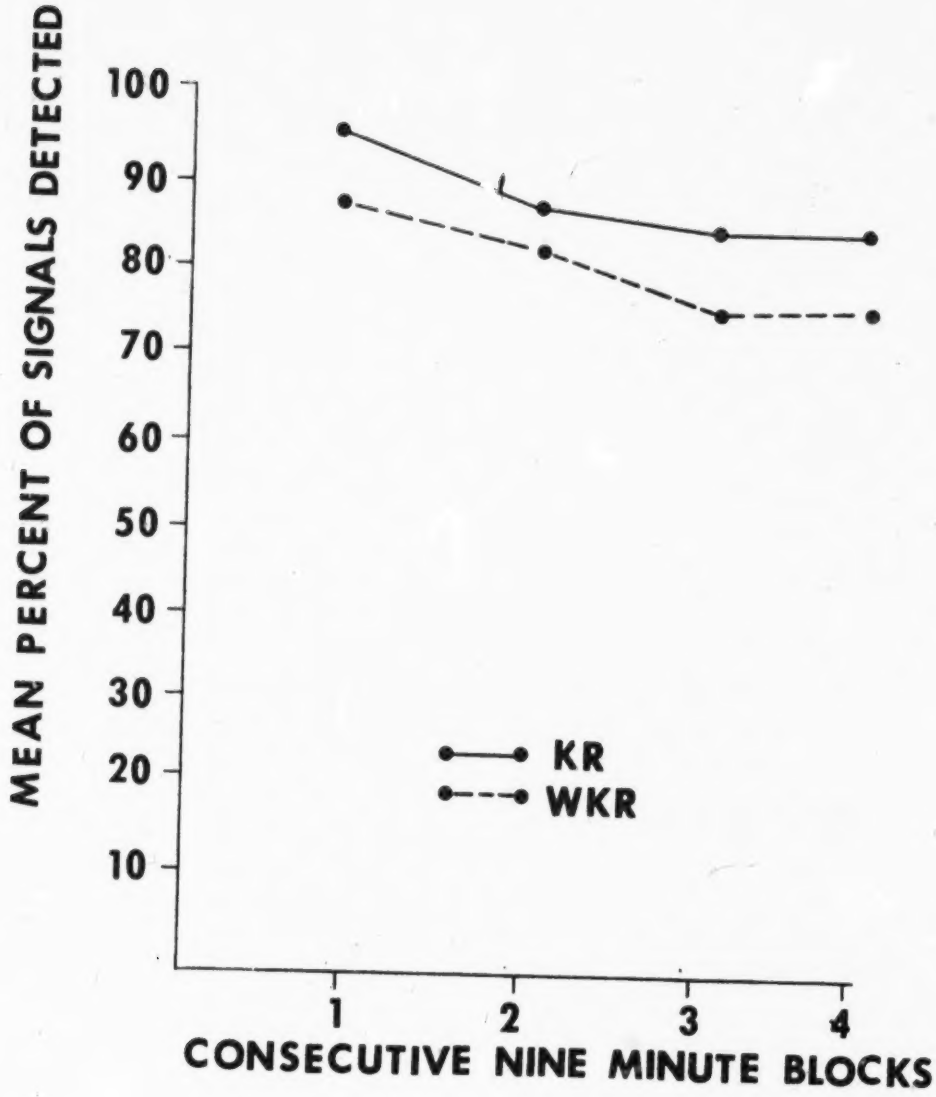
Figure 1

PERCENT OF SIGNALS DETECTED
FOR THE KR GROUP VS. WKR GROUP


MEAN PERCENT OF SIGNALS DETECTED
100
90
80
70
60
50
40
30
20
10
KR
WKR
1
2
3
4
CONSECUTIVE NINE MINUTE BLOCKS